

Proposal for establishing a new Virtual Team in the EGI-InSPIRE project for promoting Desktop Grid solutions

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Title

Promoting Desktop Grid Solutions - Virtual Team (DG VT)

Goal of the project (What is its expected output?)

Desktop Grids (as a middleware technology for e-Infrastructures) is available for NGIs as a result of multi-year long joint work between the EGEE-III/EGI-InSPIRE and the EDGeS/EDGI projects.

The technology enables NGIs to access the resource pool offered by volunteers or organizations worldwide.

As one of the key stakeholders in the Desktop Grid related research field, MTA SZTAKI from NGI_HU with the strong support from the International Desktop Grid Federation (www.desktopgridfederation.org) provides bridges between EGI VOs and Desktop Grid resources in order to seamlessly integrate them. The bridges enable the interoperability between EGI core infrastructure and Desktop Grid solutions (among others) at job management, monitoring, and accounting level (https://wiki.egi.eu/wiki/Desktop_Grids_integration). The remaining documentation, training, and support related integration to be continued until the start of the VT, and completed in the framework of the VT.

However, there is a gap to be filled though – promotion of the technological solution to the NGIs, ideally through the Operation Managers – who are the single point of contact to reach site managers, and the NILs who are the single point of contact to reach those who support scientific applications with e-infrastructure solutions.

"EGI-InSPIRE is ideally placed to join together the new Distributed Computing Infrastructures (DCIs) such as clouds, supercomputing networks and desktop grids, for the benefit of user communities within the European Research Area." -- EGI-InSPIRE Project fact sheet

Despite the on-going work (see the potential value section) and the benefits of the integrated Desktop Grid DCI resources available for EGI users, only a part of the EGI community is aware of the latest Desktop Grid related achievements, and a fraction of the EGI users and infrastructure operators take their advantages in everyday practice.

In order to get closer the EGI community and Desktop Grid community; a part of the targeted objectives are technical ones but there is stronger focus on the human aspects – training, networking and support activities.

Main objectives of the proposed Virtual Team:

1. Promote and train the Desktop Grid related technologies in the EGI communities
2. Utilize the available bridged Desktop Grid resources (such as EDGeS@home) by more VOs
3. Increase the number of heavily used EGI applications on the integrated (Desktop Grid) infrastructure with focus on widespread tools/solutions/approaches
4. Improve documentation including
 - a. Road maps (<http://desktopgridfederation.org/road-map>),
 - b. Training materials (<http://desktopgridfederation.org/technical-wiki>), and
 - c. Manuals (<http://doc.desktopgrid.hu>).
5. Complete the final remaining steps for full integration concerning e.g. support tools
6. Find joint EGI champion(s) - IDGF ambassador(s)

The resources being requested

(What skillset does the Virtual Team aim to gather from NGIs?)

The VT will be led by MTA SZTAKI from the Hungarian NGI. Minimum 0.5 and maximum 2 person-months are expected from each participant NGIs depending on the available skills, experts, and applications in the given NGI. Mostly the communication/dissemination channels to the enlisted stakeholders (see below in the table) are required from the EGI.eu, and reviewers/advisors for the expected deliverables.

Required skills	Related objective(s)	Related task(s)
Application experts: developers and/or heavy users	3, 4	0, 3
Infrastructure operators: Operation managers, VO/site managers	2	0, 4
User support team members	3, 4	0, 2
Dissemination team members	1, 4, 5	0, 1

Tasks

Task 0: Full definition of the project objectives, motivation, method, deliverables and timeframe.

Task 1: Dissemination: on-line channels, printed materials, webinar and face-to-face events with focus on the benefits of Desktop Grids. Objective 1 will be targeted with these dissemination activities.

Task 2: Training: improve and add training materials about integrated Desktop Grids to repositories / give trainings (on-line, on-site) on-demand. Objectives 4 will be addressed directly with these technical training/documentation activities but it also serves as base for Objective 3 (i.e. having more applications on the infrastructure).

Task 3: Application support: user community/ambassador identification and improve support activities. Objective 3 will be addressed directly with this support activity but it also gives output/feedbacks for Objective 4 (i.e. improve the documentation).

Task 4: Infrastructure integration: extend more EGI VOs with Desktop Grids (deploy new or use existing modified Computing Elements for bridging EGI VOs and Desktop Grids). Objective 2 will be targeted with these technical activities.

The potential value of the project to EGI

According to common experiences gained in the application related workpackages of the EDGeS, EDGI, DEGISCO, and IDGF-SP projects, or recently with the joint work with (among others) the DIRAC community, a large set of EGI **applications** are suitable for Desktop Grid resources as well, e.g. parameter studies, master-worker type, Monte Carlo type simulations, bag-of-tasks, model refinement, etc. A generic overview about the Desktop Grid related technologies is available on the e-Science Talk website as well¹. Several application examples have been made available online, e.g. EGI AppDB contains

¹ <http://www.e-science.org/briefings/EST-Briefing-19-DesktopGrid-w.pdf>

more than 20 Desktop Grid enabled applications using BOINC and similar middleware technologies as the result of three successfully completed Desktop Grid related FP7 projects (EDGeS, EDGI, DEGISCO) and the on-going IDGF-SP project (www.idgf-sp.eu).

Moreover, GBAC (Generic BOINC Application Client, <http://gbac.sourceforge.net>), clouds and further virtualization technologies related to Desktop Grids enable the execution of a class of EGI applications efficiently and natively, i.e. *without modification*.²

Concerning the **infrastructure** side; MTA SZTAKI operates large-scale volunteer Desktop Grids, and offers them for EGI users (through production level bridges) with more than 6000 average amount of cores available from Desktop Grid resources (https://metrics.egi.eu/activity_metrics/task-sa1/QR12):

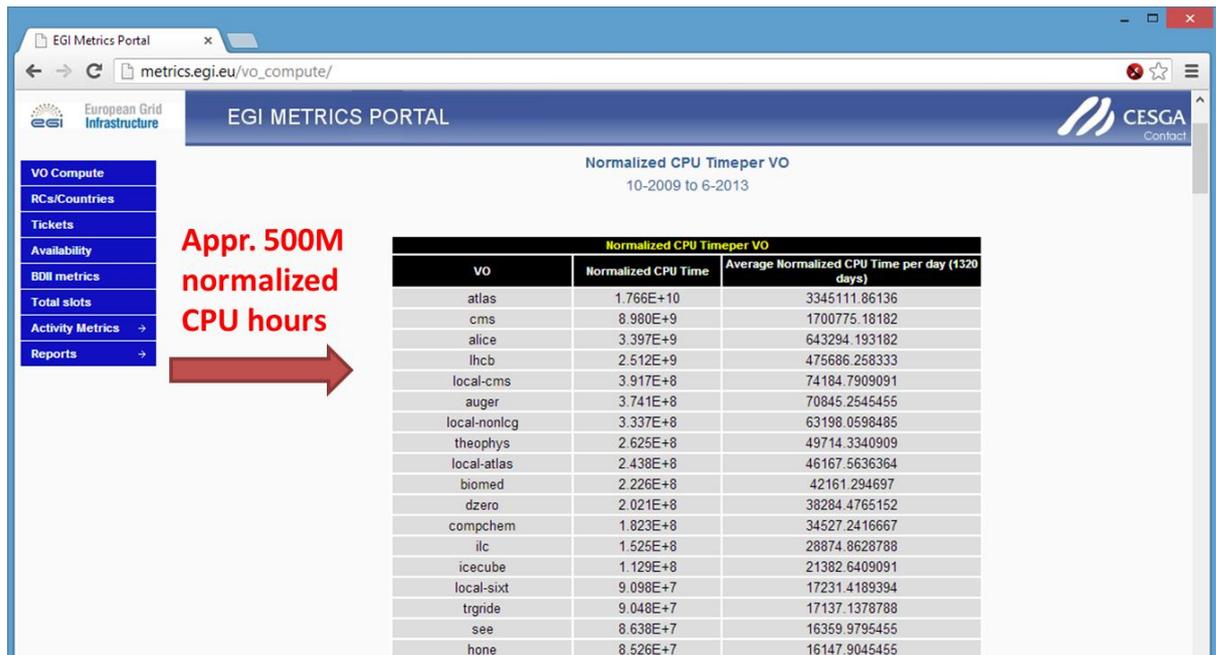
- *SZTAKI Desktop Grid* (<http://szdg.lpds.sztaki.hu/szdg>) dedicated particularly for NGI_HU users: all-together 100.000 registered computers and 600 million credits (in BOINC terminology) or normalized CPU hours (in kSI2K used in EGI) have been delivered since 2005
- *EDGeS@home* allocated for EGI users: recently reached the 300 million credits or normalized CPU hours that have been delivered since 2009 (see the following diagram)



Source: boincstat.org

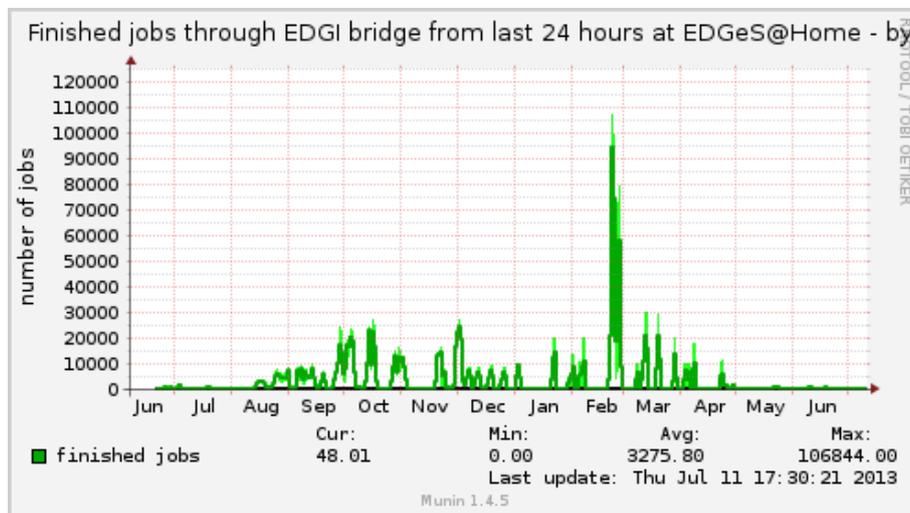
Since 2009 these two Desktop Grids have been already provided more than 500 million normalized CPU hours to scientists, i.e. it would mean the 5th position on the top list of VOs in terms of delivered compute power:

² As a recent result, e.g. DIRAC applications have become experimentally supported.



Source: metrics.egi.eu

The following statistics show the bursts in load; the number of bridged jobs to EDGeS@home infrastructure (in daily bases). As the result of joint work in the VT; not only bursts but constant load is expected from the supported larger set of EGI VOs.



Source: desktopgridfederation.org

Concerning the benefits – Desktop Grids provides **cost-efficient** and large-scale DCIs because “the resource pool is self-financing, self-updating and self-maintaining; millions of citizens purchase new computers, upgrade system software, maintain their

computers, pay their electricity bills and donate their unused capacities for scientific purposes". Detailed description of the benefits is available in David Anderson's article on volunteer computing³. (The campus version of Desktop Grids uses spare capacities of the PC labs.) Therefore, the NGIs and the resources centers are able to extend their capacities at a fraction of cost⁴ contrary to the sometimes low or not enough budget provided for equipment and operation. In this way, the VT would contribute also to the **sustainability** of the DCIs participating in the world-wide EGI infrastructure since it offers a low-cost, alternative, and interoperable solution. (Detailed cost analysis will be available soon on the IDGF website.) Several DCI operators have already realized these benefits, and more and more DCIs with additional Desktop Grid resources are getting available, e.g. in Russian Federation (<https://gridedu.jinr.ru/DesktopGridTestbed>), or in Malaysia (<http://idec2.upm.edu.my/gci2013/download/summit/05-Report3years.pdf>).

Last but not least, the VT and Desktop Grids will open up new **communication channels** towards citizens who donate computational time for scientific purposes. E.g. campaigns with prize drawings among the top volunteers, attractive screensavers at the client side can bring the "message" from scientists to citizens. The joint IDGF ambassador(s)/EGI champion(s) would help also the better communication.

The expected duration of the project and effort required:

6 months (from 21th October 2013)

Dates for the final and any intermediate outputs:

Deadline	Output
Month 2	Identification of applications and VOs to be extended, collecting requirements, first trainings
Month 4	First set of new supported VOs and applications are ready
Month 6	Improved training/dissemination materials, selected new ambassador(s)/champion(s), final report with all supported VOs and applications

³ David P. Anderson: Volunteer computing: the ultimate cloud. ACM Crossroads 16(3): 7-10 (2010)

⁴ <http://www.westminster.ac.uk/news-and-events/news/2011/university-of-westminster-launches-new-diy-supercomputer-saving-hundreds-of-thousands-of-pounds>

Appendix

List of organization as expected founding members of the Virtual Team (i.e. already expressed their interests in participating in the VT):

- MTA SZTAKI, Hungary (Robert Lovas, Jozsef Kovacs)
- University of Westminster, UK (Tamas Kiss, with endorsement from the UK NGI)
- Utrecht University/WeNMR, The Netherlands (Alexandre Bonvin)
- IBERCIVIS, Spain (Fermin Serrano Sanz)
- Malaysian Academic Grid, Malaysia (M. Farhan Sjaugi)
- ASGC, Taiwan (Vicky Huang)